Remarks

Entry of the amendments, reconsideration of the application, as amended, and allowance of all pending claims are respectfully requested. Claims 50-57, 59-63 and 66-90 remain pending.

With the above amendments, applicants are further clarifying their join protocol in an effort to further prosecution of this application. These amendments are being made without acquiescence to any of the rejections. Support for the amendments can be found throughout the specification (e.g., FIG. 9A; page 20, lines 1-10; page 12, lines 13-15, etc.), and therefore, no new matter has been added.

Additionally, the non-elected claims are cancelled herein, without prejudice. Applicants respectfully reserve the right to pursue the subject matter of these claims in one or more continuing applications.

In the Final Office Action dated October 19, 2005, claims 50-57, 66-73 and 78-85 are rejected under 35 U.S.C. 102(e) as being anticipated by Moiin et al. (U.S. Patent No. 5,999,712); and claims 59-62, 74-77 and 86-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moiin in view of Gamache et al. (U.S. Patent No. 6,401,120). Applicants respectfully, but most strenuously, traverse these rejections to any extent deemed applicable to the amended claims for the reasons herein.

Applicants' invention is directed to managing processing groups of a distributed computing environment. In one aspect, applicants' invention is directed to a protocol used to join a prospective member to a processing group. As one example, the protocol is used to join a prospective member to an active processing group. The join protocol includes various steps taken to ensure configuration consistency. Specifically, a sequence number is used throughout the join protocol to control whether a prospective member joins the group and to ensure configuration consistency.

As one particular example, applicants claim a method of managing processing groups of a distributed computing environment (e.g., independent claim 50). The method includes, for instance, requesting via a request by a prospective member to join a processing group of

the distributed computing environment, the request including a sequence number indicating a version of the processing group; determining whether the prospective member can join the processing group, the determining employing the sequence number, wherein the determining includes comparing by the prospective member the sequence number in the request with a current group sequence number to determine if the join should continue; and joining the processing group by the prospective member, in response at least in part to the determining indicating that the prospective member can join the processing group. Thus, in this aspect of applicants' claimed invention, a prospective member requests to join a processing group and that request includes a sequence number indicating a version of the processing group. The sequence number of the request is used in determining whether the prospective member can join the processing group. For example, the prospective member compares the sequence number in the request with the current group sequence number to determine if the join should continue. Applicants respectfully submit that one or more of these claimed features is not described, taught or suggested in Moiin.

While applicants agree that both Moiin and applicants' claimed invention have a join membership protocol and that Moiin uses sequence numbers, applicants do not agree that the use of sequence numbers in Moiin is the same as the use of sequence numbers in applicants' claimed invention. Thus, applicants respectfully submit that their claimed invention is not described, taught or suggested by Moiin.

For example, applicants' claim recites determining whether the prospective member can join the processing group, the determining comprising comparing by the prospective member the sequence number in the request of the prospective member with the current group sequence number to determine if the join should continue. It is this comparison that determines, at least in part, whether the join should continue. This is not described, taught or suggested in Moiin.

Moiin does not describe, teach or suggest comparing sequence numbers to determine whether the join of a prospective member to a processing group should continue. That is, Moiin does not describe using sequence numbers to control whether a join of a prospective member to a processing group is to continue. It does not describe comparing a sequence

number of the prospective member's request to a group sequence number to determine whether the join of the prospective member to the processing group is to continue, as explicitly claimed by applicants.

As one example, col. 7, lines 27-36 of Moiin are cited in the Office Action as teaching applicants' claimed element of "determining whether the prospective member can join the processing group, said determining employing the sequence number, wherein the determining comprises comparing by said prospective member the sequence number in the request with a current group sequence number to determine if the join of the prospective member to the processing group should continue". Applicants respectfully submit, however, that there is no description in that cited section of Moiin of, for instance, comparing by the prospective member the sequence number in the request with the current group sequence number to determine if the join of the prospective member to the processing group is to continue. The cited lines of Moiin merely indicate which messages are to be processed by a node and these lines explicitly state that this comparison is not used for the joiner. Specifically, Moiin states:

> However, there is a significant exception. If the message
> comes from a node with the 'joiner' flag set, it will be
> processed even if the state is stale (more than one behind).
> These are the nodes that are trying to join the cluster and we
> must accept their initial messages.

There is no discussion in this cited section of Moiin of comparing the sequence numbers to determine if the join of the prospective member to the group is to continue. As a matter of fact, it is assumed that the joiner's sequence number is zero (col. 7, lines 27-29 of Moiin). There is no discussion of comparing the joiner's sequence number with a group sequence number to determine if the join of the prospective member is to continue.

As a further example, col. 7, lines 65-67 are cited in support of the rejection. However, those lines merely state that the node trying to join will communicate with current members to see if the node can join the cluster. There is no discussion of sequence numbers. There is no discussion of using the sequence number of the prospective member to determine whether the join can continue. There is no discussion of the determining comprising comparing by the prospective member the sequence number in the request with the current

group sequence number to determine if the join of the prospective member of the processing group is to continue. These details are not described in this section of Moiin or any other section of Moiin.

Additionally, col. 9, line 20 – col. 10, line 5 are cited as teaching this aspect of applicants' claimed invention. However, these lines just indicate that each node prior to entering the membership algorithm will have a sequence number that is the same for all nodes in the current cluster. There is no description, teaching or suggestion of comparing by the prospective member the sequence number in the request to join with the current group sequence number to determine if the join of the prospective member to the processing group should continue, as claimed by applicants. There is no such discussion of these claimed features in this cited section of Moiin or any other section of Moiin.

Further, there is no such comparison in the membership algorithm described under col. 10 of Moiin. Applicants respectfully submit that there is no description, teaching or suggestion in Moiin of determining whether the prospective member can join the processing group, said determining employing the sequence number, wherein the determining comprises comparing by said prospective member the sequence number in the request with the current group sequence number to determine if the join of the prospective member to the processing group should continue, as claimed by applicants.

Since Moiin does not describe, teach or suggest one or more aspects of applicants' invention, as claimed in independent claim 50, applicants respectfully request an indication of allowability for independent claim 50, and similar independent claims. Further, the dependent claims are patentable for the same reasons as the independent claims, as well as for their own additional features.

In addition to the above, applicants respectfully submit that claims 59-62, 74-77 and 86-89 are patentable over the combination of Moiin and Gamache. In one example, independent claim 59 recites a method of managing processing groups of a distributed computing environment. The method includes, for instance, joining a prospective member to an inactive processing group; comparing a sequence number of the processing group with a sequence number of the prospective member; updating the sequence number of the

processing group, in response to the comparing indicating a particular difference; determining whether a quorum of members has joined the processing group; setting the sequence number of the processing group, in response to the determining indicating a quorum of members has joined the processing group; and initiating activation of the processing group, in response to the setting. Thus, in this aspect of applicants' claimed invention, a join protocol is provided that joins a prospective member to an inactive processing group. The join protocol includes various steps, one of which is setting a sequence number of a processing group, in response to a determination that a quorum of members has joined the processing group. Thus, the sequence number is set in response to a quorum of members joining the group. This feature, at the very least, is not taught or suggested by the combination of Moiin and Gamache.

As explicitly admitted in the Office Action, Moiin does not teach applicants' claimed element of setting the sequence number of the processing group, in response to the determining indicating that a quorum of members has joined the processing group. Thus, Gamache is relied upon. However, Gamache does not overcome the deficiencies of Moiin.

While Gamache mentions quorum and sequence numbers, Gamache does not describe, teach or suggest what is explicitly recited in applicants' claimed invention. For example, Gamache does not describe, teach or suggest the setting of a sequence number of a processing group, in response to the determining indicating a quorum of members has joined the processing group. Instead, in Gamache, the sequence number is set to indicate the most up-to-date replica in a quorum of replicas. That is, the sequence number in Gamache is updated in response to determining the most up-to-date replica from among the replicas in a quorum (see, e.g., col. 2, lines 24-26 of Gamache). It is not set in response to determining that a quorum of members has joined the processing group.

The sequence number in Gamache is not used to indicate whether a quorum has been reached, but instead, is used to specify which of a set of replicas is the most up-to-date replica. There is no description, teaching or suggestion in Gamache of determining whether a quorum of members has joined a processing group, and then, setting the sequence number of the processing group, in response to determining that the quorum has been met.

Support for this rejection is indicated at col. 2, lines 23-25 of Gamache. However, again, applicants respectfully submit that those lines merely indicate that the sequence number is used to indicate the most up-to-date replica member. There is no teaching or suggestion in Gamache of setting the sequence number, in response to determining that a quorum of members has joined the processing group.

Since both Moiin and Gamache fail to describe, teach or suggest at least applicants' claimed element of setting a sequence number of the processing group in response to the determining indicating a quorum of members has joined the processing group, applicants respectfully submit that the combination of Moiin and Gamache also fails to teach or suggest this claimed feature.

For at least these reasons, applicants respectfully request an indication of allowability for claim 59 and similar independent claims. Further, the dependent claims are patentable for the same reasons as the independent claims, as well as for their own additional features.

Based on the foregoing, applicants respectfully request an indication of allowability for all pending claims.

Should the Examiner wish to discuss this case with applicants' attorney, please contact applicants' attorney at the below listed number.

Respectfully submitted,

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